CLAIMS

I claim:

1. A complex comprising:

a. a target-binding moiety, which in said complex is capable of specifically binding a target;

b. a cavity-forming moiety; and

c. a pharmacological compound,

wherein:

said pharmacological compound is present in the cavities of said cavity-forming moiety and is bound non-covalently thereto; and

said target-binding moiety is bound to said cavity-forming moiety.

2. The complex according to claim 1, wherein said cavity-forming moiety is a recombinant protein.

3. The complex according to claim 1, wherein said target-binding moiety is a recombinant polypeptide.

4. The complex according to any one of claims 1 to 3, wherein said cavity-forming moiety and said target binding moiety are part of a single polypeptide.

5. The complex according to any one of claims 1 to 4, wherein said target-binding moiety comprises a ligand for a cell surface receptor.

6. The complex according to any one of claims 1 to 4, wherein said target-binding moiety comprises an antigen-binding fragment of an antibody.

7. The complex according to claim 6, wherein said antigen-binding fragment binds a cell surface protein.

8. The complex according to any one of claims 1-7, wherein said cavity-forming moiety and said target-binding moiety are each independently a protein selected from the group consisting of the NGF-family of neurotrophic factors, their chimeras, IL-1b, IL-2, IL-3 and other interleukins, GM-CSF, EGF, FGF, barnase, T4 lysozyme, TGFb and IgG.

9. The complex according to any one of claims 1-8, wherein said pharmacological compound is bound to said complex with a dissociation constant of less than 1 mM under physiological conditions.

10. The complex according to claim 9, wherein said pharmacological compound is bound to said complex with a dissociation constant of less than 0.1 mM under physiological conditions.

11. The complex according to any one of claims 1-10, wherein said pharmacological compound has a size of less than 800 $Å^3$.

12. The complex according to claim 11, wherein said pharmacological compound has a size of less than 400 $Å^3$.

13. The complex according to any one of claims 1-10, wherein said pharmacological compound is selected from a cytotoxic compound, an antiviral compound, an anti-inflammatory compound, an immunosuppressant, a chemotherapeutic agent, a radioisotope, or an ion.

14. The complex according to claim 13, wherein said pharmacological compound is selected from Ca^{++}, Zn^{++}, ^{99m}Tc, ^{67}Cu, ^{90}Y, urea, phenol, salicylic acid derivatives, cis-platinum, etoposide, vincristine, lysodren, ifosfamide, myleran, thiotepa and other nitrogen mustard derivatives, hydroxyurea, carmustine, other nitrosourea derivatives, antibiotics, AZT, 3TC, Cidofovir, or an HIV protease inhibitor.

15. A pharmaceutical composition comprising

a. a complex according to any one of claims 1 to 14 in an amount sufficient to deliver a therapeutic amount of the pharmacological compound present in said complex to a desired target in a patient; and

b. a pharmaceutically acceptable carrier.

16. A method of delivering a pharmacological compound to a target in a patient, comprising the step

of administering to said patient a pharmaceutical composition according to claim 15.

17. The method according to claim 16, wherein said target is selected from a molecule, a cell, a tissue, an organ, a virus, a bacteria, a yeast, a fungus, or other microorganism or another surface that is capable of binding specifically to said complex.

18. The method according to claim 18, wherein said target comprises a protein that binds to said carrier.

19. The method according to claim 18, wherein said protein is a cell surface protein.

20. The method according to claim 18 or 19, wherein said protein is a receptor.

21. The method according to claim 19, wherein said protein is selected from a cytokine receptor, a chemokine receptor, a neurotrophin receptor or a cell surface antigen.

22. The method according to claim 21, wherein said protein is selected from trkA, trkB, trkC, p75, IL-1R, IL-2R, IL-3R, GM-CSFR, EGFR, FGFR, CD33 and CD4.

23. A method of purifying a pharmacological compound away from unwanted chiral forms of said

compound and other contaminants in a mixture comprising the steps of:

a. combining said mixture with a target-binding moiety and a cavity-forming moiety under conditions wherein a complex is formed, said complex containing said pharmacological compound occluded within a cavity of said cavity-forming moiety, and wherein said cavity-forming moiety is not capable of occluding unwanted chiral forms of said compound and other contaminants in said mixture under said conditions;

b. separating said complex from said mixture; and

c. releasing said pharmacological compound from said complex.

24. A method for producing a complex according to claim 1, comprising the steps of:

a. dispersing a pharmacological compound in a pharmaceutically acceptable solution suitable for therapeutic administration; and

b. adding a cavity-forming moiety and a target-binding moiety to said pharmacological compound under conditions which occlude said compound in a cavity of said cavity-forming moiety and form the desired complex.

25. The method of claim 24, wherein said conditions are heating for less than 30 minutes at a temperature of between 40°C and 90°C followed by cooling to a temperature of between 4°C and 25°C.

26. The method of claim 24, wherein said conditions are exposure to pH 1 to 5 or 9 to 14 for less than 60 minutes, followed by return to a physiological pH.

27. The method of claim 24, wherein said conditions are the presence of an at least 10-fold excess of said pharmacological compound, followed by removal of any of said compound that is not occluded.

28. The method of claim 24, wherein said conditions are exposure to a denaturant selected from urea or guanidine, followed by removal of said denaturant.